10.0 Detailing Practice

10.1 Drawings

The following is to provide the novice with basic information on computer drafting and the fundamentals of file management, and plotting for this activity.

Drafting and plotting of drawings is done from BREWS (BRidge Engineers WorkStation) terminals. These terminals operate on the VMS operating system, and GDS is the drafting software used by the Bridge Division. GDS is designed with built-in macros that retrieve information based on filenames that you select from menus or input in batch mode.

STDROOT:[FGB]TBFF.FGB is an example of a filename, where:

STD: is the root directory where all the files for the STD job are kept. A job is generally defined as the work to be done for a particular L-XXXX (where L = Location and XXXX = the accounting number assigned to the job)

[FGB] is the subdirectory where all drawing files are kept.

TBFF is the user's name for the file. This has a 32 character limit and the first 8 characters must be unique.

.FGB is the file extension. FBG is always the GDS extension for all drawings.

Please note that all colons, brackets and periods must be used as shown in the example.

Directories provide a convenient way to keep job files together, but only if they are used with consistency and updated regularly (clean out obsolete files etc.). Users should choose directory names that are relative to the job they are working on (State Route numbers, bridge numbers, ramp designations, acronyms). This makes it easier for someone to find files that pertain to your job should you be unavailable. Using directories is also important in terms of achieving job files. It is easy to transfer all files that pertain to a job (and only those files that pertain to the job) to a tape when these files are consolidated in one directory.

A user can have personal directories or the computer support personnel can set up a job directory to be used by a group of users.

To call up a CAD sheet, first select the job directory listing menu in the lower left of the GDS window. A listing of job directories appear on the screen; choose the proper job and then, from the next menu, the CAD sheet file you want.

10.1.1 Standard Office Practices

A. Purpose

The purpose of these standards is to enable the Bridge Branch to produce consistent and effective plan sheets which will have uniform appearance and information. Engineers and detailers are responsible for ensuring that these criteria are implemented.

B. Planning

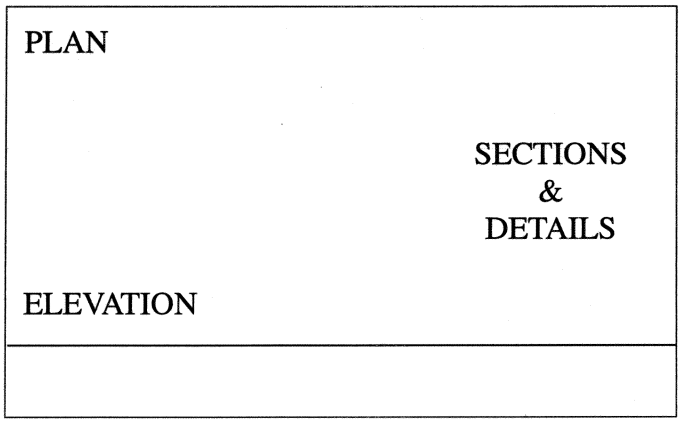
The engineer coordinates with the structural detailer the scope of the detailing work involved. Similar bridge plans and details should be reviewed and kept as examples for maintaining consistent detailing practices. These examples should not be older than three years.

C. Drawing Orientation and Layout Control

1. Standard bridge sheet format is 33 1/2 inches x 22 1/2 inches with the bottom 2 inches used for title block and related information.

2. Regular graphite lead or ink shall be used on vellum drawings. Ink or plastic lead only shall be used on mylar drafting film.

3. Drawings shall be carefully organized so the intent of the drawing can be read easily. North arrows shall be placed on layouts and footing layouts. (See Chapter 2 and 10.1.2 for special requirements for preliminary plan and layout sheets.) Related details shall be grouped together in an orderly arrangemnet. Do not overcrowd the drawing with details. The following is a standard sheet configuration when plan, elevation, and sectional views are required.



D. Lettering

1. General

a. Text # 4 *Ames Lettering Guide* Manual, CBR 35 CADD.

Titles #6 *Ames Lettering Guide* Manual, CBR 70 CADD.

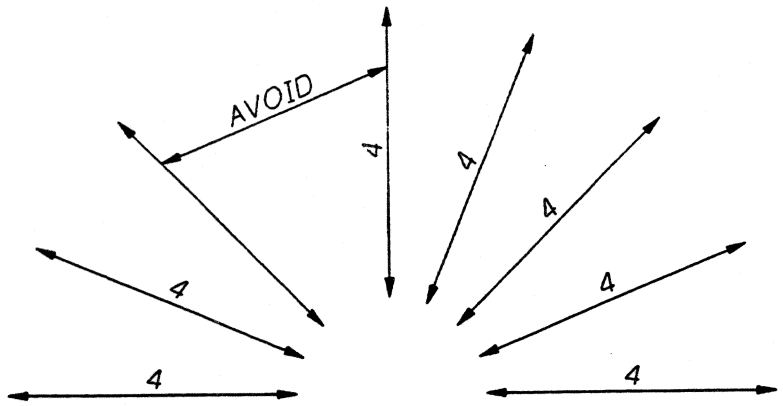
Underline all titles with a single line having the same weight as the lettering used. Use "bas TITLE".

b. Lettering shall be upper case only, slanted at approximately 68 degrees angle on the Ames Lettering Guide and of uniform height.

c. Lettering shall be oriented so as to be read from the bottom right edge of the sheet.

2. Dimensioning

a. A dimension shall be shown once on a drawing, unless repeating it is necessary for clarity. Duplication and unnecessary dimensions should be avoided. All dimension figures shall be placed above the dimension line, and so that they may be read from the bottom of the right edge of the sheet, as shown in the following detail:



b. Reinforcing bar clearances need not be specified on plans unless different from the "general Notes."

c. When details or structural elements are complex, utilize two drawings. One for dimensions and the other for reinforcing bar details.

d. Dimensions 12 inches or more shall be given in feet and inches unless the item dimensioned is conventionally designated in inches (for example, 16′ pipe).

e. In dimensions more than 1 foot, fractions less than 1 inch shall be proceeded by 0 (for example, 3′-0¾″.

f. Placement of dimensions outside the view, preferably to the right or below, is desirable. However, in the interest of clarity and simplicity it may be necessary to place them otherwise. Examples of dimensioning placement are shown on Figure 10.1.1-1.

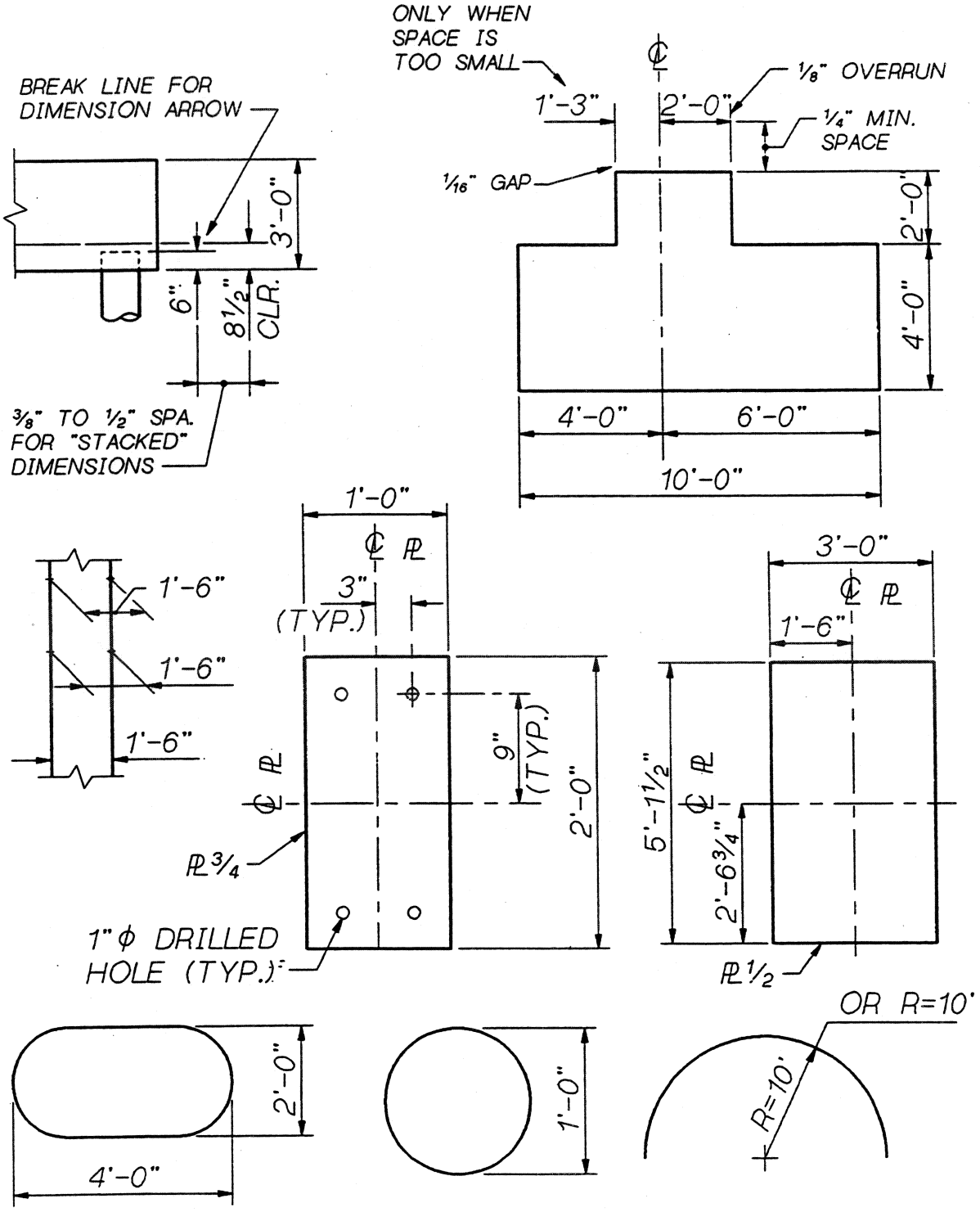


Figure 10.1.1-1

E. Line Work

1. All line work must be of sufficient size, weight, and clarity so that it can be easily read from a print that has been reduced to one-half the size of the original drawing. The line style used for a particular structural outline, centerline, etc., shall be kept consistent wherever that line is shown within a set of bridge plans.

2. Linework shall have appropriate gradations of width to give line contrast as shown below. Care shall be taken that the thin lines are dense enough to show clearly when reproduced.

	Manual	CADD Linestyle
Centerline	Thin	LCENT
Dimension	Thin	LDIM
Leader	Thin	LARROW
Break (long)	Thin	LBREAK
Extension Line	Thin	LA
Existing Structure Reference Line	Medium	LHHW
Existing Structure Hidden Line	Thin	LDASH
Hidden	Medium	LDASHB
Rebar	Medium	LREBAR
Section	Thick	LSEC
Outline or Visible Line	Thick	LD

3. When drawing structural sections showing reinforcing steel, the outline of the section shall be a heavier line weight than the rebar.

   The Mark No. "bubble" for reinforcing steel shall be a rectangle. use "[" "]" to create text rectangles.

   Epoxy coated reinforcement shall be denoted by a triangle in the following manner.

F. Scale

When selecting a scale, it should be kept in mind that the drawing will be reduced. Generally, the minimum scale for a section detail with rebars is $^{3}/_{8}$ inch = 1 foot. The scale used on steel bridge plans will be $^{3}/_{4}$ inch = 1 foot minimum.

Sections and views may be enlarged to show more detail, but the number of different scales used should be kept to a minimum.

G. Graphic Symbols

1. Graphic symbols shall be in accordance with the following:

   a. Structural Steel Detailing: AISC *Steel Construction Manual* see structural steel chart.

   b. Welding symbols: See Lincoln Welding Chart.

2. Symbols for hatching different material is shown on Figure 10.1.1-2.

H. Structural/Architectural Sections, Views, and Details

1. A section cuts through the structure; a view is from outside the structure; a detail shows a structural element in more detail — usually a larger scale.

2. Whenever possible, sections and views shall be taken looking to the right ahead on station or down. Care shall be taken to ensure that the orientation of a detail drawing is identical to that of the plan, elevation, etc., from which it is taken.

3. On plan and elevation drawings where it is impossible to show cut sections and details, the section and detail drawing should immediately follow the plan and elevation drawing unless there are a series of related plans. If it is impractical to show details on a section drawing, a detail sheet should immediately follow the section drawing. In other words, the order should be from general plan to more minute detail.

4. Structural and architectural sections, views, and details shall be identified by a circle divided into upper and lower halves.

   Examples are shown in Figure 10.1.1-3.

5. Breaks are allowable in lines provided that their intent is clear.

6. Each pier shall be detailed separately as a general rule. If the intermediate piers are identical except for height, then they can be shown together.

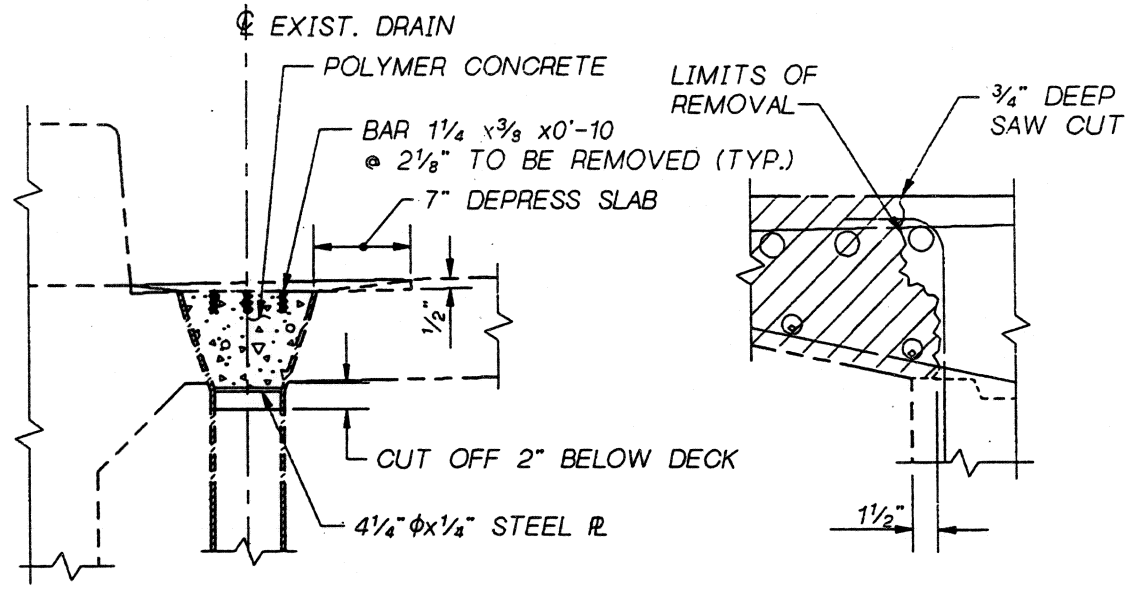
I. Revisions

1. Manual Techniques

   a. Pencil on paper can simply be erased and done over.

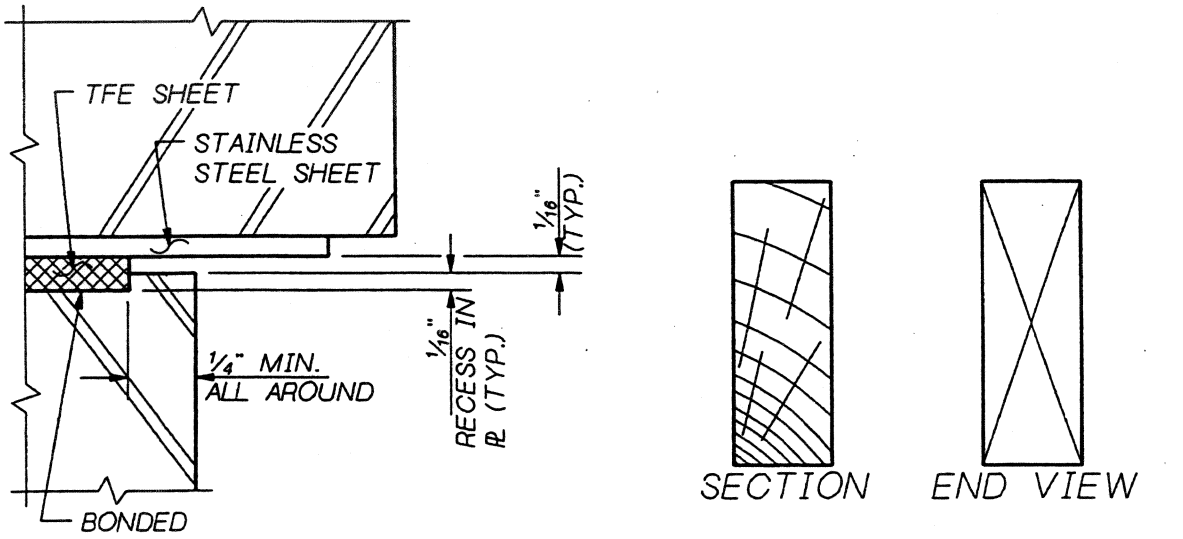
   b. Ink on film can be washed off with plain water. Older drawings may need to soak awhile or use rubbing alcohol, but this is preferable to erasing, which will remove the matte finish and make the area difficult to draw on.

   c. Photo lines can usually be eradicated using chemical eradicators (Solutions A and B) available from the vault. This preserves the surface finish. If the chemical is ineffective, check to see if the print is reverse reading in which case the eradicator must be applied to the back. (Reverse reading film positives are actually preferable so that changes are not made on the same surface from which the lines are removed.) Erasing on the front of a mylar sheet should be a last resort as it removes the surface finish.



TYPICAL CONCRETE DETAIL

TYPICAL REMOVAL DETAIL



TYPICAL STEEL DETAIL

TYPICAL TIMBER DETAIL

Figure 10.1.1-2

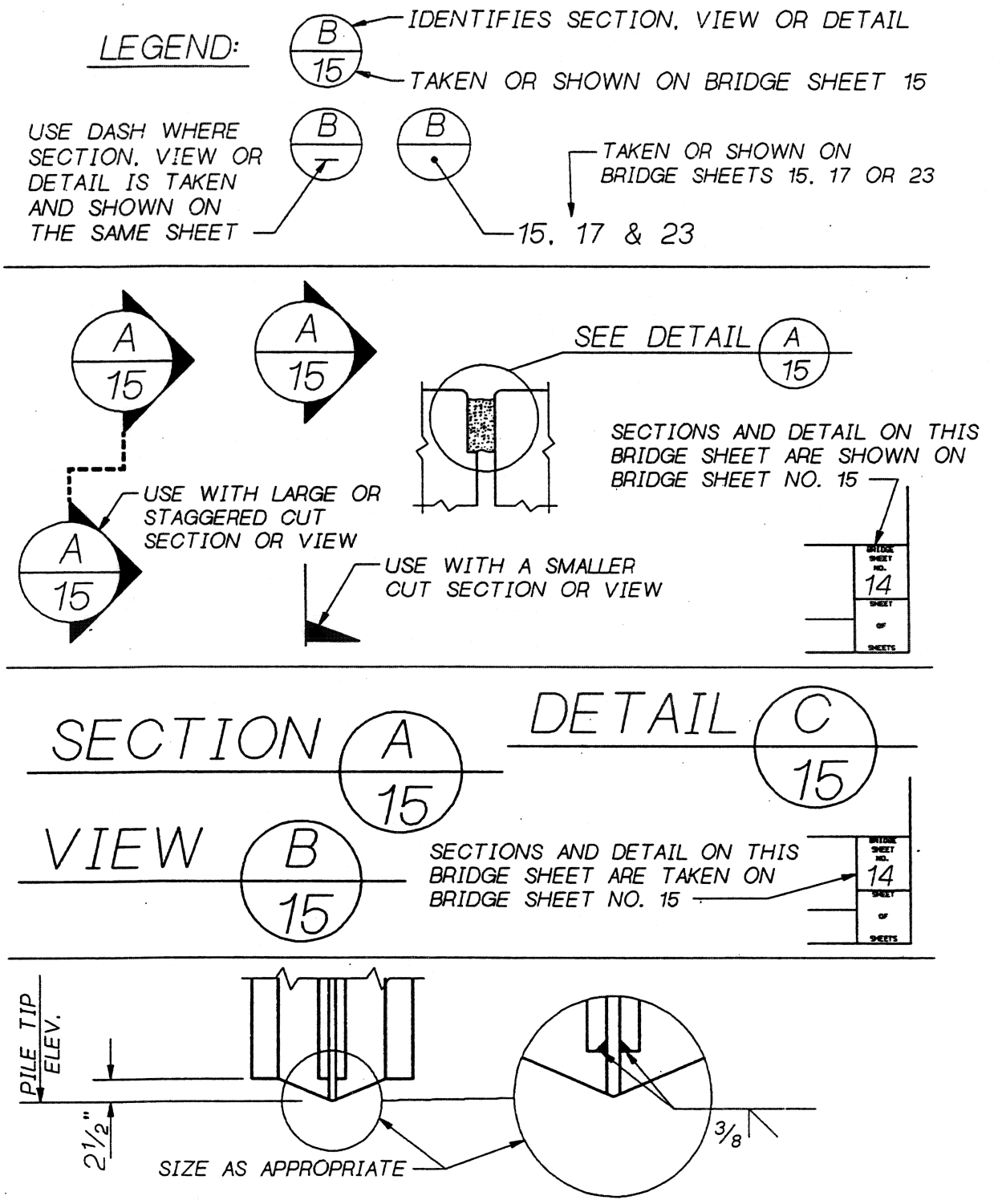


Figure 10.1.1-3

d. Plastic lead on film must be erased with a soft eraser, taking care to avoid removing the surface finish.

e. Film surface damaged by erasing may be restored by careful roughening with a hand eraser.

f. A chemical solution called sepia eradicator can be used to eradicate lines on sepias. The Bridge Branch seldom uses sepias, but if needed, this solution may be obtained from the stockroom if no one in Bridge has a bottle.

2. Cadd sheets shall be changed on the cadd film and replotted.

3. Plan Revisions Versus Addendums

a. All changes to plans require initials of the Bridge Engineer or the Unit Design Supervising Engineer. The locations of all changes (except deletions) shall be shaded so they can be easily found. Shading on preliminary plans is removed before printing the ad copies. The old method of using a number enclosed in a circle enclosed in a triangle is no longer acceptable.

b. Use the revision block in the left margin to record changes, including the due date and description of each change, made after the preliminary plan is signed by the Bridge Engineer, but before the ad copy. This left margin block is also removed before printing the ad copies.

c. The Olympia Service Center Plans Branch places a border along the bottom of the plan sheets. This border contains blocks where the Plans Branch assigns sheet numbers, a contract number, a title, and a revision block for the contract plans. For changes made after the ad copy is mailed out (addendum) fill in the revision block, including the due date and description of each addendum. Also, include the contract title, contract number, and sheet number assigned by the Plans Branch (e.g., if *bridge* sheet number 4 of 7 was assigned *plan* sheet number 18 or 30 by the Plans Branch, it must remain *plan* sheet 18 of 30 if revised).

J. Care of Original Manual Drawings

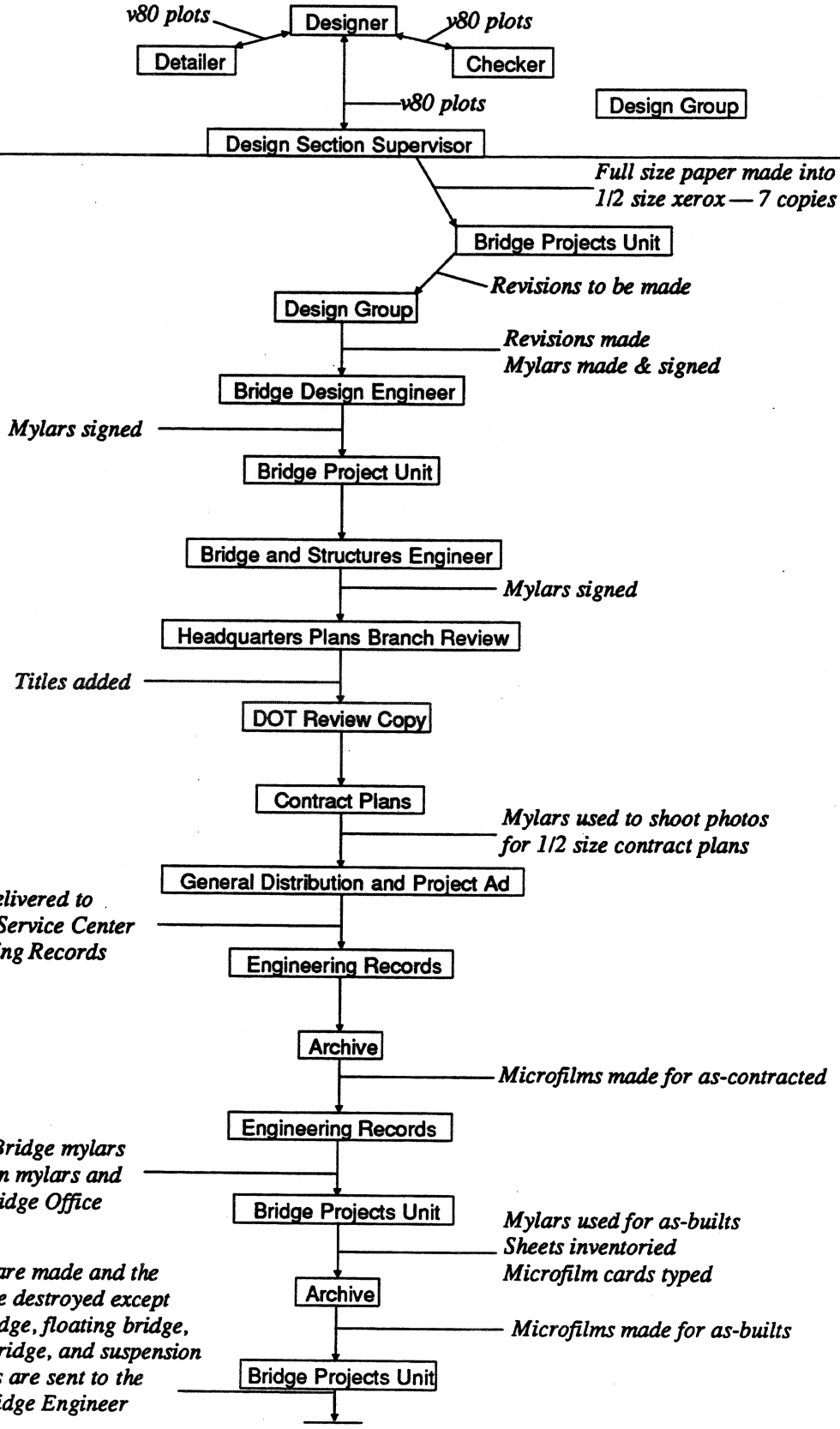
1. Original manual drawings should be handled with care to avoid damaging them in any way.

2. Original manual drawings should be stored flat, either in a designated file or in the drafter's desk.

3. If it is necessary to leave an original manual drawing out overnight, it should be covered to reduce exposure to mishap.

4. An original manual drawing shall not be used for review or checking. All review or checking shall be done from prints.

PLAN SHEET PROCESSING



10.1.2 Final Layout

a. General — The original preliminary plan will be used to create the final layout. Views, data, and notes may be repositioned to improve the final product.

b. Items on the preliminary plan which should not appear on the final layout are as follows:

1. Typical roadway sections.
2. Notes to the district.
3. Vertical curve, superelevation, and curve data for other than main line.
4. Other information that was preliminary or that will be found elsewhere in the plans.

c. Items not normally on the preliminary plan which should be added are as follows:

1. Test hole locations (designated by 3/16 inch circles, quartered) to plan view.
2. Elevation view of footings, seals, piles, etc. Show elevation at bottom of footing and, if applicable, the type and size of piling.
3. General notes above legend in upper right-hand corner usually in place of the typical section.
4. Title "LAYOUT" in the title block and sheet number in the space provided.
5. Other features, such as lighting, conduit, signs, excavation, riprap, etc., as determined by the designer.
6. The layout check list can be used for reference. See Chapter 2.

10.1.3 Bar Lists

Barlist files are different from regular drawing files in that they consist of nine sheets (or windows). In order to view the various sheets type in DR SHEETn where n is a number from 1 to 9. All special bend types must be drawn in the SPECIAL window (DR SPECIAL). If the special bends are drawn in any of Sheets 1 through 9 they will be erased when the BARLIST program is rerun. Special bend types drawn in the SPECIAL window will appear on all sheets and will not be erased when BARLIST is rerun.

Barlists have a different set of menus in GDS. While you are in GDS make the following selections:

DWG MGT
FILES
MENU PERS
BARLIST

This will get you into the special menus to put page numbers on the sheets and plot bar lists.

To create page (or plan sheet) numbers for bar list sheets, select the First Sheet No. option in the NAMES menu then enter the value of the first page number. All subsequent sheets will be numbered automatically. If the page number is alphanumeric (that is, it contains both letter and number parts) then choose the Sheet No. Prefix(Letter) option in the NAMES menu. Do not use this option if there is no letter in the page number.

There are three ways to plot barlist sheets. Plotting can be done interactively in a GDS session by typing DR SHEETn then using PLOT NOW, or by using the F9 AND F10 function keys (F9 will plot fullsize and F10 halfsize), or by using batch procedures as described in section 10.1.5. The batch routine will ask you how many sheets there are to the barlist and will plot them all whereas PLOTNOW and the function keys will plot only one sheet at a time.

Barlist sheets do not require an engineers stamp.

10.1.4 Bridge Standard Plans and Office Standards

a. New standards and revisions to existing Standard Plans are made according to the same standard office practices as plan sheets.

b. Use of standard sheets for contract plans from the CADD office.

   1. Copy the standard file to your directory and rename the new file by picking "Copy STD file" from the FILES menu.

   2. A plot should be made on which the designer marks the required changes.

   3. Using the marked plot as a guide, the structural detailer makes changes and requests new plots.

   4. SR number, job number, sheet number, and title should be added on layout sheet only.

c. Changes are made to the master CADD standard file upon the receipt of the revision from the BDM coordinator with his signature/initials and current date of the new revision.

10.1.5 Plotting

The user can plot either interactively in GDS or use the SPLOT command after a VMS prompt. Plotting may take as long as 20 minutes, so be patient. It depends on how many plots are already waiting. To see a listing of plot files waiting type PLIST at the VMS prompt. See section 10.1.3 for plotting bar lists.

Interactive Plotting

There are two interactive ways to plot in GDS. The user can make menu selections, or can use function keys.

PLOT NOW is a menu pick that will plot what is on the screen. Depending on your selection, you can get full size, half size or laser printer plots on the screen.

Functions Keys are a short cut method to menu selections. Function key F9 plots a full size sheet and F10 plots halfsize.

Batch Plotting

Using SPLOT (to Plot a Single Sheet)

A drawing may be requested at any terminal by the commands given in the example below. You will need to know the filename, which is shown above the WSDOT logo on every sheet.

The procedures would be as shown below for file, **NRUP116**ROOT:[FGB]**LAYOUT**.FGB. (beginning at the VMS prompt):

VS15A>**SPLOT**
(EXIT or Ctrl/Z to quit)
FILENAME: **LAYOUT**
PLOT SIZE: Large OR [Small], or 3 for Laser print:
Hit the Return key for the default smal or enter 'L' for large.

NUMBER OF COPIES [1]:
Hit the Return key for the default 1 or enter the number of copies you want.

Using MPLOT (to Plot Multiple Sheets)
Please note that this routine can tie up a plotter for hours.

First, create a data file that includes all the filenames for the sheets you want to plot. In the following example the data file **PLOTLIST** is set up to plot: NEBAR, JUNKTST, and LAYOUT. The routine begins at the VMS prompt (this is not in the menus).

VS15A>**MPLOT**
PLOT LIST INPUT FILE: **PLOTLIST**
DIRECTORY NAME (NO FGB):**NRUP116**
PLOT SIZE: Large OR [Small]:
Hit the Return key for the default small or enter large

NOW SUBMITTING PLOT OF NRUP116FGB:NEBAR, TO BATCH
Job SINGLE_BATCH_PLOT (queue VS15A_BATCH, entry 20) started on VS15A_BATCH

ERROR IN LOCATING NRUP116FGB:JUNKTST.FGB

NRUP116FGB:LAYOUT.FGB IS LOCKED BY [RUDEEN]
UNABLE TO PLOT

As you can see, only one file, NEBAR, was actually plotted. JUNKTST does not exist, and LAYOUT is currently being used by Jeff Rudeen.

Abbreviations

A. General

1. Because different words sometimes have identical abbreviations, the word should be spelled out where the meaning may be in doubt.
2. A few standard signs are in common use in the office of Bridge and Structures. These are listed with the abbreviations.
3. A period should be placed after all abbreviations, except as listed below.
4. Apostrophes are usually not used. Exceptions: pav't., req'd., r'dway.
5. Abbreviations for plurals are usually the same as the singular. Exceptions: figs., no., ctrs., pp.
6. Abbreviations in titles should be avoided if possible.

B. List of abbreviations commonly used on bridge plan sheets:

A	
about	abt.
abutment	abut.
adjust, adjacent	adj.
aggregate	agg.
alternate	alt.
ahead	ahd.
aluminum	al.
Americal Society for Testing and Materials	ASTM
American Association of State Highway and Transportation Officials	AASHTO
and	&
angle point	A.P.
approved	apprd.
approximate	approx.
area	A
asbestos cement pipe	Asb. Cp
asphalt concrete	AC
Asphalt concrete pavement	ACP
asphalt treated base	ATB
at	@ (used only to indicate spacing or pricing, otherwise spell out).
avenue	Ave.
average	avg.
B	
back	bk.
back of pavement seat	B.P.S.
bearing	Brg.
begin horizontal curve (Point of Curvature)	P.C.
begin vertical curve	BVC
bench mark	BM
between	betw. or btwn.
bituminous surface treatment	BST
bottom	bot.
boulevard	Blvd.
bridge	Br.
bridge drain	Br. Dr.

building	bldg.
buried cable	BC
C	
cast-in-place	CIP
cast iron pipe	(C.I.P.)
center, centers	ctr., ctrs.
centerline	
center of gravity	CG
center to center	ctr. to ctr., c/c
Celsius (formerly Centrigrade)	C
cement treated base	CTB
centimeters	cm.
class	Cl.
clearance, clear	clr.
compression, compressive	comp.
column	col.
concrete	conc.
conduit	cond.
concrete pavement (Portland Cement Concrete Pavement)	PCCP
construction	const. or constr.
continuous	cont. or contin.
corrugated	corr.
corrugated metal	CM
corrugated steel pipe	CSP
countersink	csk.
county	Co.
creek	Cr.
cross beam	X-Bm.
crossing	Xing
cross section	X-Sect.
cubic feet	CF or cu. ft. or $ft.^3$
cubic inch	cu. in. or $in.^3$
cubic yard	CY or cu. yd. or $yd.^3$
culvert	culv.
D	
degrees, angular	° or deg.
degrees, thermal	C or F
diagonal(s)	diag.
diameter	diam. or
diaphragm	diaph.
dimension	dim.
district	Dist.
double	dbl.
drive	Dr.
E	
each	ea.
each face	E.F.
easement	ease., esmt.
East	E.
edge of pavement	EP
edge of shoulder	ES

endwall	EW
electric	elect.
elevation	el. or elev.
embankment	emb.
end horizontal curve (Point of Tangency)	P.T.
end vertical curve	EVC
Engineer	Engr.
equal(s)	eq. (as in eq. spaces) or = (mathematical result)
estimate(d)	est.
excavation	exc.
excluding	excl.
expansion	exp., expan.
existing	exist.
exterior	ext.
F	
Fahrenheit	F
far face	FF
far side	FS
feet (foot)	ft. or '
feet per foot	ft./ft or '/' or '/ft.
field splice	F.S.
figure, figures	fig., figs.
flat head	F.H.
foot kips	ft-kips
foot pounds	ft-lb
footing	Ftg.
forward	fwd.
freeway	Fwy.
G	
gallon(s)	gal.
galvanized	galv.
galvanized steel pipe	GSP
gauge	ga.
General Special Provisions	GSP
girder	gir.
ground	gr.
guard railing	GR
H	
hanger	hgr.
height	ht.
height (retaining wall)	H
hexagonal	hex.
high strength	H.S.
high water	H.W.
high water mark	H.W.M.
highway	Hwy.
horizontal	horiz.
hour(s)	hr.
hundred(s)	hund.

I	
included. including	incl.
inch(es)	in. or "
inside diameter	I.D.
inside face	I.F.
interior	int.
intermediate	interm.
invert	inv.
J	
joint	jt.
junction	jct.
K	
kilometer(s)	km.
kilopounds	kips, K.
L	
layout	LO
left	lt.
length of curve	L.C.
linear feet	L.F.
longitudinal	longit.
lump sum	L.S.
M	
maintenance	maint.
malleable	mall.
manhole	MH
manufacturer	mfr.
maximum	max.
mean high water	MHW
mean higher high water	MHHW
mean low water	MLW
mean lower low water	MLLW
meters	m.
mile(s)	mi.
miles per hour	mph
millimeters	mm.
minimum	min.
minute(s)	min. or '
miscellaneous	misc.
modified	mod.
monument	Mon.
N	
National Geodetic Vertical Datum	N.G.V.D.
near face	NF
near side	NS
North	N.
Northbound	NB
not to scale	NTS
number; numbers	#, No.; Nos.

O	
original ground	O.G.
ounce(s)	oz.
outside diameter	O.D.
outside face	O.F.
out to out	O to O
overcrossing	O-Xing
overhead	OH
P	
page; pages	p.; pp.
pavement	pav't.
pedestrian	Ped.
per cent	%
pivot point	PP
Plans, Specifications and Estimates	PS&E
plate	or PL
point	pt.
point of compound curve	PCC
point of curvature	P.C.
point of intersection	P.I.
point of reverse curve	PRC
point of tangency	P.T.
point of vertical curve	PVC
point of horizontal curve	POC
point of tangent	POT
polyvinyl chloride	PVC
portland cement concrete	PCC
pound, pounds	lb., lbs., #
pounds per square foot	psf, lbs./ft.^{2},lbs./ ',#/ '
pounds per square inch	psi, lbs./in.^{2}, lbs./ ",#/ "
power pole	PP
precast	P.C.
pressure	pres.
prestressed	P.S.
prestressed concrete pipe	P.C.P.
Puget Sound Power and Light	P.S.P.&L.
Q	
quantity	quant.
quart	qt.
R	
radius	R.
railroad	RR
railway	Rwy.
Range	R.
regulator	reg.
reinforced, reinforcing	reinf.
reinforced concrete	RC
reinforced concrete box	RCB
reinforced concrete pipe	RCP
required	req'd.
retaining wall	Ret. Wall

revised (date)	rev.
right	rt.
right of way	R/W
road	Rd.
roadway	rdwy.
route	Rte.
S	
seconds	sec. or "
Section (map location)	Sec.
Section (of drawing)	Sect.
sheet	sht.
shoulder	shldr., shld. or sh.
sidewalk	SW, sdwk
South	S.
southbound	SB
space(s)	spa.
splice	spl.
specification	spec.
square foot (feet)	sq. ft. or $ft.^2$
square inch	sq. in. or $in.^2$
square yard	SY, sq. yd. or $yd.^2$
station	Sta.
standard	std.
stiffener	stiff.
stirrup	stirr.
street	St.
structure, structural	str.
support	supp.
surface, surfacing	surf.
symmetrical	symm.
T	
tangent	Tan. or T.
telephone	Tel.
temporary	temp.
test hole	T. H.
thick(ness)	th.
thousand	M
thousand feet board measure	MBM
ton(s)	T.
total	tot.
township	T.
transition	trans.
transportation	transp.
transverse	transv.
treatment	tr.
typical	typ.
U	
ultimate	ult.
undercrossing	U-Xing

V	
variable, varies	var.
vertical	vert.
vertical curve	BV
vitrified clay pipe	VCP
volume	vol. or V
W	
water surface	W.S.
weight(s)	wt.
welded steel pipe	WSP
swelled wire fabric	W.W.F.
West	W.
Willamette Meridian	W.M.
wing wall	W.W.
with	w/
without	w/o
Y	
yard, yards	yd., yds.
year(s)	yr.

10-1-A1:V:BDM10

Structural Steel

Flat pieces of steel are termed plates, bars, sheets, or strips, depending on their dimensions. Bars and plates aregenerally classified as follows:

Bars: up to 6 inches wide, .203 in. ($^3/_{16}$ inch) and over in thickness
6 inches to 8 inches wide, .230 in. ($^7/_{32}$ inch) and over in thickness

Plates: over 8 inches wide, .230 in. ($^7/_{32}$ inch) and over in thickness
over 48 inches wide, .180 in. ($^{11}/_{64}$ inch) and over in thickness

Thinner pieces up to 12 inches wide are strips and over 12 inches are sheets. A complete table of clasification may be found in the *AISC Manual of Steel Construction*, 8th Ed. page 6-3.

The following table shows the usual method of labeling some of the most frequently used structural steel shapes. Note that the inches symbol (″) is omitted, but the foot symbol (′) is used.

PLATES	PL ½ x 34 x 5′-6 GROUP SYMBOL; THICKNESS IN INCHES; WIDTH IN INCHES; LENGTH IN FEET AND INCHES	ANGLES	L 6 x 5 x ¾ x 2′-1 GROUP SYMBOL; LONG LEG IN INCHES; SHORT LEG IN INCHES; THICKNESS IN INCHES; LENGTH IN FEET AND INCHES
FLAT BARS	BAR 2 x ¾ x 0′-6 GROUP SYMBOL; WIDTH IN INCHES; THICKNESS IN INCHES; LENGTH IN FEET AND INCHES	RECTANGULAR TUBES	TS 6 x 5 x ¼ x 3′-2 GROUP SYMBOL; WIDTH IN INCHES; WIDTH IN INCHES; WALL THICKNESS IN INCHES; LENGTH IN FEET AND INCHES
SQUARE BARS	BAR 2 □ x 3′-4 GROUP SYMBOL; SIZE IN INCHES; CONVENTION FOR "SQUARE"; LENGTH IN FEET AND INCHES	CIRCULAR TUBES	TS 3 OD x ¼ x 2′-5 GROUP SYMBOL; OUTSIDE DIAM. IN INCHES; WALL THICKNESS IN INCHES; LENGTH IN FEET AND INCHES
ROUND BARS	BAR 2 ⌀ x 0′-4 GROUP SYMBOL; SIZE IN INCHES; CONVENTION FOR "ROUND"; LENGTH IN FEET AND INCHES		

Footing Layout

The Footing Layout is a plan of the bridge limiting the details shown to those needed to locate the footings. The intent of the footing layout is to minimize the possibility of error at this initial stage of construction. Other related information and/or details such as pile locations, pedestal sizes, and column sizes are considered part of the pier drawing and should not be included in the footing layout.

The Footing Layout should be shown on the layout sheet if room allows. It need not be in the same scale. When the general notes and footing layout cannot be included on the first (layout) sheet, the footing layout should then be included on the second sheet.

Longitudinally, footings should be located using the survey line to reference such items as the footing, centerline pier, centerline column, or centerline bearing, etc., as shown on the pier details sheet.

Appendix 10.5-B1-1 is an example of a footing layout showing:

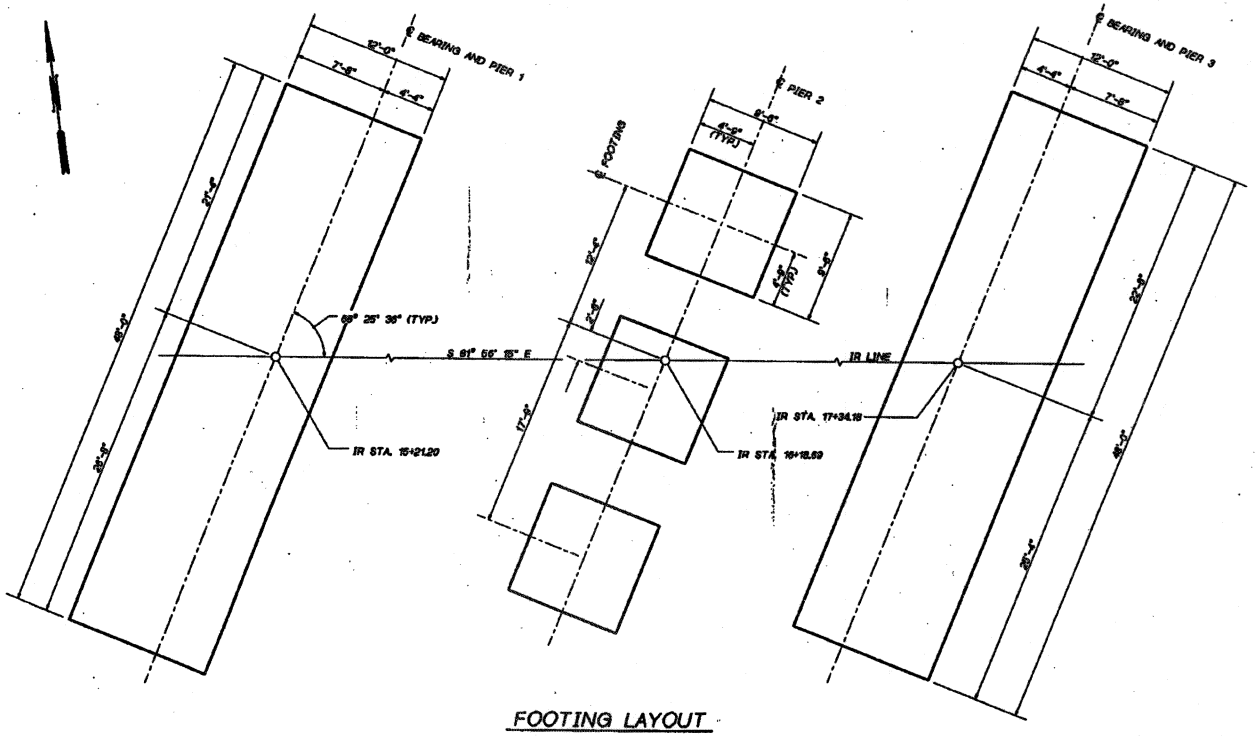
The basic information needed.

The method of detailing from the survey line.

Notes:

1. When seals are required, their locations and sizes should be clearly indicated on the footing layout.
2. This example shows a complicated geometry as the result of the combined efforts of a horizontal curve and the presence of the sharp skew. This is the reason for the odd dimensions shown in factuions of an inch. In most designs the footing layout would be much simpler.

10-1-A3:V:BDM10



FOOTING LAYOUT

Bridge Design Engr.				REGION NO.	STATE	FED. AID PROJ. NO.				
Supervisor				10	WASH.					
Designed By				JOB NUMBER						
Checked By										
Detailed By										
Bridge Projects Engr.										
Prelim. Plan By										
Architect/Specialist	DATE	REVISION	BY	APP'D						

Washington State Department of Transportation

FOOTING LAYOUT

SHEET ___ OF ___ SHEETS